AMMONIUM SULFATE

CAS Registry Number: 7783-20-2 $(NH_4)_2SO_4$

Molecular Formula: $H_8N_2O_4S$

Ammonium sulfate occurs as odorless crystals, or brown-gray to white granules. It is soluble in water and insoluble in alcohol and acetone. When it decomposes, it releases very toxic fumes (Sax, 1989).

Physical Properties of Ammonium Sulfate

Synonyms: diammonium sulfate; diammonium salt of sulfuric acid,

Molecular Weight:	132.14
Melting Point:	280 °C
pH:	5.5 (0.1 M aq solution)
Density/Specific Gravity:	1.77 at 50 °C

(HSDB, 1991; Merck, 1989; Sax, 1989)

SOURCES AND EMISSIONS

A. Sources

Ammonium sulfate is used as a nitrogen source in fertilizers, in water treatment, in flameproofing materials, in tanning, in galvanizing iron, and for analytical purposes. Ammonium sulfate is also used in the manufacture of viscose silk, ammonia alum, and hydrogen sulfide (Merck, 1989).

Ammonium sulfate is registered as a pesticide adjuvant. It is used to facilitate the application of other pesticides, and as a synthetic fly attractant. The licensing and regulation of pesticides for sale and use in California are the responsibility of the Department of Pesticide Regulation (DPR). Information presented in this fact sheet regarding the permitted pesticidal uses of ammonium sulfate has been collected from pesticide labels registered for use in California and from DPR's pesticide databases. This information reflects pesticide use and permitted uses in California as of October 15, 1996. For further information regarding the pesticidal uses of this compound, please contact the Pesticide Registration Branch of DPR (DPR, 1996).

B. Emissions

No emissions of ammonium sulfate from stationary sources in California were reported, based on data obtained from the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1995a).

C. Natural Occurrence

No information about the natural occurrence of ammonium sulfate was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient measurements of ammonium sulfate.

INDOOR SOURCES AND CONCENTRATIONS

Leaderer et al. (1993) found that unvented kerosene heaters increased indoor sulfate levels over outdoor levels and surmised that the major form of the sulfate was ammonium sulfate. Several studies conducted in the eastern United States (in California, sulfuric acid rather than nitric acid, predominates outdoors) found that indoor sulfate levels were less than or similar to outdoor sulfate levels and were predominantly of outdoor origin (Suh et al., 1994; Suh et al., 1992; Brauer et al., 1991). An unknown fraction of the sulfate is likely to be in the form of ammonium sulfate.

ATMOSPHERIC PERSISTENCE

In the atmosphere, ammonium sulfate is particle-associated and hence subject to wet and dry deposition. The average half-life for particles and particle-associated chemicals in the troposphere is estimated to be about 3.5 to 10 days (Balkanski et al., 1993).

AB 2588 RISK ASSESSMENT INFORMATION

Ammonium sulfate emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics "Hot Spots" Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to ammonium sulfate are inhalation, ingestion, and dermal contact.

Non-Cancer: Concentrated ammonium sulfate can burn the eyes or skin. Systemic effects from ammonium or sulfate ion are unlikely except in the case of massive doses or in the case of

patients with pre-existing liver disease (HSDB, 1995). Inhalation of ammonium sulfate for short durations can impair respiratory function, especially in asthmatics. The United States Environmental Protection Agency (U.S. EPA) has not established a Reference Concentration (RfC) or an oral Reference Dose (RfD) for ammonium sulfate (U.S. EPA, 1995a).

Cancer: Ammonium sulfate has not been evaluated for carcinogenic potential by the International Agency for Research on Cancer or the U.S. EPA (IARC, 1987a; U.S. EPA, 1995a).